Attorney Docket No. T1118/20075
Preliminary Amendment Dated 07/14/04

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

- 1. (Currently Amended) A polyurethane comprising a thiol substituent pendant from at least one nitrogen and/or at least one carbon atom of the polyurethane, provided that when the thiol substituent is pending from the at least one carbon atom, the thiol substituent does not include a SH group.
- 2. (Currently Amended) The polyurethane of claim 1, wherein the thiol substituent has a formula:

$$-R_L-(S-R^1)_n$$

wherein n is an integer from 1 to 3; R_L is an (n+1)-valent organic radical comprising at least one carbon atom; and R^1 is a member selected from the group consisting of H, $C(O)R^3$, and SR^4 , wherein R^3 is a member selected from the group consisting of C_1 to C_6 alkyl and R^4 is a heterocyclic group or an electron deficient aromatic group.

- 3. (Original) The polyurethane of claim 2, wherein R_L is a bivalent organic radical selected from the group consisting of C₁ to C₁₈ alkylene, C₁ to C₁₈ alkyleneamino, C₁ to C₁₈ alkyleneoxy, C₁ to C₁₈ haloalkylene, C₂ to C₁₈ alkenylene, C₆ to C₁₈ arylene, a modified C₂ to C₁₈ alkenylene having at least one carbon substituted by a halogen group, C₂ to C₁₈ alkenylene having one or more O, S, or N atoms incorporated into an alkenylene chain, a bivalent heterocyclic radical, and mixtures thereof.
 - 4. (Original) The polyurethane of claim 3, wherein R_L is C_1 to C_6 alkylene.
 - 5. (Original) The polyurethane of claim 4, wherein R_L is butylene.
- 6. (Original) The polyurethane of claim 3, wherein the bivalent heterocyclic radical is a member selected from the group consisting of thiazoline, thiazolidone, imidazole, imidazole, thiadazole, thiadazole, imidazole, pyridine, and morpholine.
- 7. (Original) The polyurethane of claim 6, wherein the bivalent heterocyclic radical is pyridine.
 - 8. (Original) The polyurethane of claim 2, wherein R¹ is H.

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- 9. (Original) The polyurethane of claim 2, wherein R¹ is SR⁴.
- 10. (Original) The polyurethane of claim 2, wherein R⁴ is 2-pyridyl.
- 11. (Original) The polyurethane of claim 2, wherein R⁴ is 3-carboxy-4-nitrophenyl.
- 12. (Original) The polyurethane of claim 1, wherein the thiol substituent is pendant from about 0.5 to 50% of urethane nitrogen atoms.
- 13. (Original) The polyurethane of claim 1, wherein the thiol substituent is pendant from about 0.5 to about 50% of carbon atoms.
- 14. (Original) The polyurethane of claim 1, wherein the thiol substituent is pendant from 1 to 20% of urethane nitrogen and/or carbon atoms.
- 15. (Original) The polyurethane of claim 1, wherein the thiol substituent is pendant from 5 to 10% of urethane nitrogen and/or carbon atoms.
- 16. (Original) The polyurethane of claim 1, wherein the polyurethane comprises at least about 10 micromoles of the thiol substituent per gram of the polyurethane.
- 17. (Original) The polyurethane of claim 1, wherein the polyurethane has at least two different thiol substituents pendant from urethane nitrogen and/or carbon atoms.
- 18. (Original) The polyurethane of claim 1, wherein the thiol substituent is an acetylthio group.
- 19. (Original) The polyurethane of claim 1, wherein the thiol substituent is a 3-carboxy-4-nitrophenyldithio group.
- 20. (Original) A process for preparing the polyurethane of claim 1, the process comprising:

providing a polyurethane comprising a urethane amino moiety; providing a multifunctional linker reagent of a formula:

LG-Rt-(FG)n

wherein n is an integer from 1 to 3, FG is a functional group selected from the group consisting of a halogen, a carboxyl group, a sulfonate ester, and an epoxy group, LG is a leaving group selected from the group consisting of a halogen, a carboxyl group, a sulfonate ester, and an epoxy group, and R_L is an (n+1)-valent organic radical comprising at least one carbon atom;

providing a protected thiol-containing reagent of a formula R-C(O)SH, or a salt thereof,

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wherein R is a C1 to C6 alkyl group;

reacting the multifunctional linker reagent with the urethane amino moiety to form a polyurethane substituted with at least one substituent group of a formula

$$-R_L-(FG)_n$$
;

reacting the polyurethane substituted with at least one substituent group with a protected thiol-containing reagent to form the polyurethane comprising the thiol substituent pendant from the at least one nitrogen and/or the at least one carbon atom.

- 21. (Original) The process of claim 20, wherein R_L is a bivalent organic radical selected from the group consisting of C₁ to C₁₈ alkylene, C₁ to C₁₈ alkyleneamino, C₁ to C₁₈ alkyleneoxy, C₁ to C₁₈ haloalkylene, C₂ to C₁₈ alkenylene, C₆ to C₁₈ arylene, a modified C₂ to C₁₈ alkenylene having at least one carbon substituted by a halogen group, C₂ to C₁₈ alkenylene having one or more O, S, or N atoms incorporated into an alkenylene chain, a bivalent heterocyclic radical, and mixtures thereof.
- 22. (Original) The process of claim 21, wherein R_L is a member selected from the group consisting of C_1 to C_6 alkylene.
- 23. (Original) The process of claim 21, wherein R_L is butylene, FG is a bromo group, LG is a bromo group and n is 1.
 - 24. (Original) The process of claim 20, wherein LG is a bromo group.
- 25. (Original) The process of claim 20, wherein the sulfonate ester is a member selected from the group consisting of mesylate, triflate, and tosylate.
- 26. (Original) The process of claim 20, wherein the sulfonate ester is a member selected from the group consisting of a ω-bromoalkyl mesylate, a ω-bromoalkyl triflate, and a ω-bromoalkyl tosylate.
- 27. (Original) The process of claim 20, wherein the multifunctional linker reagent is a member selected from the group consisting of a dibromoalkyl compound, a bromo-carboxyalkyl compound, and a bromo-epoxyalkyl compound.
- 28. (Original) The process of claim 27, wherein the dibromoalkyl compound is a 1,ω-dibromoalkyl compound or a substituted 1, ω-dibromoalkyl compound.

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- 29. (Original) The process of claim 28, wherein the dibromoalkyl compound is a C_2 - C_61 , ω -dibromoalkyl compound.
- 30. (Original) The process of claim 28, wherein the dibromoalkyl compound is 1,6-dibromohexane or 1,4-dibromobutane.
- 31. (Original) The process of claim 27, wherein the bromo-carboxyalkyl compound is a ω -bromocarboxylic acid or a substituted ω -bromocarboxylic acid.
- 32. (Original) The process of claim 27, wherein the bromo-epoxyalkyl compound is epibromohydrin.
- 33. (Original) The process of claim 20, wherein the process is conducted in a presence of an aprotic solvent.
- 34. (Original) The process of claim 33, wherein the aprotic solvent is a member selected from the group consisting of N,N-dimethylacetamide, N,N-dimethyl formamide, 1-methyl-2-pyrrolidinone, tetrahydrofuran, dioxane, and dimethyl sulfoxide.
- 35. (Original) The process of claim 20, wherein the process is conducted in a presence of a base soluble in the aprotic solvent.
- 36. (Original) The process of claim 35, wherein the base is a member selected from the group consisting of sodium hydride, lithium diisopropylamide, and sodium.
- 37. (Original) The process of claim 35, wherein the base is potassium tert-butoxide, dimsyl sodium, lithium hydride, sodium amide, lithium N,N-dialkylamide, or lithium N,N-dicyclohexylamide.
 - 38. (Original) The process of claim 35, wherein the base is lithium tert-butoxide.
- 39. (Original) The process of claim 37, wherein the multifunctional linker reagent is 1,6-dibromohexane, and the base is lithium disopropylamide.
- 40. (Original) The process of claim 28, wherein the multifunctional linker reagent is 1.4-dibromobutane.
- 41. (Original) The process of claim 20, wherein the protected thiol-containing reagent is thiolacetic acid.
- 42. (Original) The process of claim 20, wherein the protected thiol-containing reagent is tetrabutylammonium thioacetate.

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- 43. (Original) The process of claim 20, further comprising reacting the protected thiol group with a deprotecting reagent to remove an R-C(O)- fragment from the thiol substituent to obtain the polyurethane.
- 44. (Original) The process of claim 43, wherein the deprotecting reagent is a member selected from the group consisting of ammonia, primary aliphatic amines, aqueous solutions of alkali metal hydroxides, carbonates, tri-substituted phosphates, hydroxylamine, and hydrazine.
 - 45. (Original) A process of producing a molded product, said process comprising: providing the polyurethane of claim 1, wherein the thiol substituent is protected; molding the polyurethane to form an article; and deprotecting the thiol substituent of the article to provide the molded product.
- 46. (Original) The process of claim 45, further comprising reacting the thiol substituent of the molded product with a biomolecule.
 - 47. (Original) A molded product produced by the process of claim 45.
- 48. (Original) The molded product of claim 47, wherein the molded product is an implantable device.